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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,261	09/18/2003	Ricky S. Amos	FIS920020157US1	2260

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EXAMINER	
GHYKA, ALEXANDER G	
ART UNIT	**PAPER NUMBER**
2812	

DATE MAILED: 08/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/605,261	AMOS ET AL.	
	Examiner	Art Unit	
	Alexander G. Ghyka	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *20* is/are withdrawn from consideration.

5)☒ Claim(s) *18 and 19* is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

ALEXANDER GHYKA
PRIMARY EXAMINER

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Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group I in the reply filed on June 1, 2005 is acknowledged. The traversal is on the ground(s) that a search of the subject matter in Group I would necessarily require a search of Group II. This is not found persuasive because the two groups are classified in separate classes. Interconnects are classified in 438/618, and this search would not be required for Group I.

The requirement is still deemed proper and is therefore made FINAL.

Claims 1-19 are under consideration.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims are confusing as it is not certain if the gate in line 3, is the metal gate layer in line 7. Further clarification is respectfully requested.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent

protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 3 recites the broad recitation metal oxides, and the claim also recites alumina, hafnia and other oxides which is the narrower statement of the range/limitation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu (6,465,312) in view of Chern et al (US 6,277,719).

The present Claims generally require forming a complementary metal oxide semiconductor (CMOS) by providing a gate dielectric layer on a wafer; depositing a silicon layer over said metal gate layer; patterning the wafer to form gates; depositing sidewall spacer material; etching wafer to form sidewall spacers

Yu et al disclose a CMOS transistor 10 being fabricated on a substrate 12 having a gate stack 14, which comprises a gate insulation layer 16, gate electrode 18 and a protective capping layer 20. See column 2, lines 55-62 and Figure 1. Yu et al disclose depositing a first dielectric layer over the gate stack; depositing a second dielectric layer to create dummy spacers adjacent the protrusions in the first material; etching the first dielectric layer to remove portions not protected by the dummy spacers; removing the dummy spacers; depositing an amorphous silicon layer; polishing the amorphous silicon to expose the gate stack; removing the capping layer of the gate stack; implanting dopants to extend the source drain junction; annealing the substrate; and forming silicide on the gate stack and source drain areas after which conventional contact formation and metallization processes are performed to complete the CMOS transistor as required by present Claims 1, 7, 8, 9, and 12. See column 5, line 15, to column 6, line 5.

Yu et al differs from the present claims in that it does not disclose the use of a metal gate, and does not disclose the formation of a third silicide as required by the present Claims.

Chern et al also pertain to the formation of a CMOS transistor and disclose forming a first insulating layer over a silicon substrate; forming a polysilicon layer over the first insulating layer; annealing the polysilicon layer; forming a diffusion layer over the annealed polysilicon layer; forming a tungsten layer over the diffusion layer; and patterning to form a gate structure. See column 5, lines 1-22. The CMOS transistor of Chern et al also disclose a silicide layer and a capping layer. See column 6, lines 1-25. Moreover, Chern et al disclose silicide layers of cobalt and tungsten as required by the present claims. See column 3, lines 20-40.

It would have been obvious for one of ordinary skill in the art, at the time of the invention, to use the metal containing gate of Cher et al, as the gate of Yu et al, for its known benefit as a gate in CMOS transistors, and to arrive at the presently claimed invention. As both references pertain to CMOS transistors, the use of a metal containing gate, as disclosed by Chern et al, for its known use would have been *prima facie* obvious. With respect to the formation of the third silicide layer, in general, the transposition of process steps or the splitting of one step into two, where the processes are substantially identical or equivalent in terms of function, manner and result, was held to not patentably distinguish the processes. *Ex Parte Rubin*, 128 USPQ 159 (USPQ 1959). In the present case, the repetition of the silicide process would be

considered obvious. Therefore, the present claims are *prima facie* obvious in light of of the Yu and Cherns references.

Allowable Subject Matter

Claims 18-19 are allowed.

The cited prior art does not disclose or suggest depositing a nitride/oxide bilayer surrounding the gate region; removing the polysilicon layer and sacrificial gate dielectric; growing said gate dielectric over said patterned gate structure; depositing a metal gate liner over the gate dielectric; depositing a silicon layer over the metal liner; planarizing the structure using CMP; forming a silicide metal layer; annealing the gate structure and removing any unreacted metal as require by Claims 18-19.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander G. Ghyka whose telephone number is (571) 272-1669. The examiner can normally be reached on Monday through Thursday during general business hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AGG
August 15, 2005

ALEXANDER GHYKA
PRIMARY EXAMINER

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